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Title : A genetic and environmental basis for social affiliations among bottlenose dolphins.

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Abstract : Social organisation is an important determinant of many key population processes. In terrestrial systems, studies have demonstrated that mammalian social structure is closely connected to both kinship and environmental variables. However, the challenges of the marine environment have generally constrained attempts to understand the interactions between these intrinsic and extrinsic factors in shaping social organisation of small cetaceans. Here we combine direct field-based observations with molecular genetic data to provide a detailed investigation of the social structure of bottlenose dolphins in two contrasting environments in the NE Bahamas. Analyses of photo-id data revealed that the strength and persistence of inter-individual association patterns differed between the two sites, with larger (mean = 8.52 ± 7.00) more stable (mean association index = 0.21 ± 0.10) groups occurring in an exposed environment, and smaller (mean = 3.34 ± 3.70), generally fluid (mean association index = 0.07 ± 0.04) groups being found in the more protected study site. In addition to this apparent environmental influence on social organisation, there was also evidence for a genetic basis for social affiliation. Despite the fluidity of associations in the protected site, a significant correlation ($p = 0.014$) between microsatellite relatedness and strength of association indicating a preference for affiliation among kin was revealed. In contrast, analysis of groupings in the exposed study site indicated a lack of preference for genetic relatives beyond a matrilineal basis for large groupings. The complementary analyses of social structure and genetic relatedness in the two study sites provide a unique insight into the often-opposing forces driving cetacean social structure. This study highlights the interaction between environmental factors and kinship and suggests a preference for associations among kin in the absence of environmental pressures favouring large groups.